Backup & Recovery

1230 - MAINFRAME Disk Information

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INTRODUCTION

OBJECTIVE

1230.1 DASD OVERVIEW

This section of the Operating Manual deals with the policies and procedures that exist concerning the management and use of the Information Processing Centers DASD (Direct Access Storage Devices).

The Information Processing Center has created specific 'Pools' of DASD volumes that are used to meet different storage requirements. The descriptions of these Storage Pools are contained in Section 1230.3. Each pool listed has either an 'MVS Esoteric' name or a 'SMS Storage Group' name associated to them that can be accessed by specifying the **'UNIT='** parameter to direct data sets being allocated to a volume that's associated to a Pool. The purpose of having Pooled DASD is that it relieves the User from having to code a specific volume serial number when allocating data sets. Instead, a group of volumes becomes available through the use of Esoteric Names and Storage Groups, then places the data set on any volume defined within the specified Pool.

Users are urged to use Pooled DASD in allocating their data sets, unless when required to allocate to a volume that is not associated to a Pool.

Section 1230.2 of the DASD Allocation Procedures describes when to use Pools for allocation and when to contact the Storage Administrator for assistance for allocation or placement of data sets. Both ISD Operations and Technical Support maintain the DASD devices, Operations deals primarily with Hardware problems while the Storage Administrator handles Storage issues.

The Storage Administrator will perform the following functions:

A) Ensures availability of DASD space in all Pools, and helps customers with DASD related problems or questions.

B) Manages resident data using the DFHSM (Data Facility Hierarchical Storage Manager).

C) Manages Non-Pooled DASD volumes for data sets that cannot or should not be allocated using an Esoteric Pool or a SMS Pool due to DASD considerations. The Storage Administrator will work with customers to locate additional DASD space when requested.

D) Provides customers with information on how to interface with the Information Processing Center's DASD Management products to perform recovery or storage management.

E) Manages the availability of data. Sets up and monitors the backup of customers data, and provide information regarding recovery of data and insures integrity of backups.

F) Monitor and provide information for DASD Capacity Planning.
Customers can contact the Storage Administrator for any questions or problems related to DASD during his regular working hours. If problems should arise which are DASD related during other times and assistance is required then the customer should use the normal HELP desk procedure for reporting problems.
The Storage Administrator will be contacted if required.

1230.2 DASD ALLOCATION PROCEDURES

Outlined below is the procedure customers must follow when allocating new data sets. It is important that customers follow these procedures, otherwise, data may end up being not managed or managed incorrectly. After reading this procedure you still have questions, then the Storage Administrator should be contacted for clarification.

1) Determine if the data sets that are being allocated are eligible for allocation on one of the DASD Pools. Review the descriptions of the DASD Pools that are detailed in Section 1230.3.

2) If a Esoteric Pool matches the requirements for your data set then specify the MVS Esoteric name in the (**UNIT=**) parameter. Specifying a data set name in a SMS Pool, the data set will be placed in the proper pool without requiring a (**UNIT=**) parameter.
The (**VOL=SER=**) parameter should be *excluded* when using a MVS Esoteric Pool or SMS Storage Group.

3) When defining a VSAM data set to a MVS Esoteric Pool you will need to select a volume associated with that pool then specify the volume serial number in your 'DEFINE' statement.
When defining a VSAM data set to a SMS Storage Group, a volume serial number in the ‘DEFINE’ statement is not required.
The same holds true when you allocate data sets using TSO ISPF menu screens.

4) Allocate your data sets using either an MVS Esoteric Pool, SMS Storage Group, or volume serial numbers of a Non-pooled volume based upon the evaluation procedures noted above. Refer to the Information Processing Center's JCL and Naming Standards sections for related information regarding DASD allocations.

PLEASE NOTE THE FOLLOWING POLICIES REGUARDING DATASET ALLOCATIONS

A) Un-cataloged data sets will be deleted

B) Data sets with Expiration Dates are not allowed

C) Multi-Volume data sets will be converted to single volume data sets

D) Duplicate data sets will be deleted.

E) Over Allocated data set space will be released

F) Unopened data sets will opened to allow for DFHSM management

5) If out-of-space conditions should be encountered on a volume then, the Storage Administrator should be contacted immediately. If these situations occur after the Storage Administrators normal working hours (06:00 -16:30), then contact the Information Processing Center HELP desk for assistance.

1230.3 STORAGE POOLS

Outlined below are the MVS Esoteric Pools and SMS Storage Groups currently available on all MAINFRAMES. Each pool characteristic is described in detail. A description outlines exactly how each pool is managed and what the restrictions are for each. Use this outline to determine where your data sets belong then follow the instructions in section 1230.2 regarding data set allocations.

POOL DESCRIPTIONS

TSODA POOL is a MVS Esoteric Pool. Data sets with the users TSOID are to be placed in this pool by specifying (**UNIT=TSODA**) in the JCL.
TSO/ISPF defined data sets will automatically be directed to this pool when logging on to TSO.

Data set example below:

- **TSOID.anything**

HSM Migration of data sets start after five (5) days of non-use (Unchanged) by migrating (MOVING) data sets from it's original volume to a HSM ML1 (DASD) volume, after 30 days of non-use on ML1 (Not Recalled) the data set would be migrated to a HSM ML2 (TAPE) volume. The migrated data set would remain on ML2 for a period of two years before being deleted by HSM.
HSM maintains one copy of a migrated data set since HSM physically moves a data set. When displaying a migrated data set it will show a volume of MIGRAT1 or MIGRAT2 depending on the migration level.
If a migrated data set cannot be recalled, you can delete the migrated copy and recover with a backup data set if appropriate.

HSM Backups are done for newly created (OPENED) or pre-existing (CHANGED) data sets from Monday through Saturday evenings starting at 19:00.
HSM maintains a maximum of three backup versions of each individual data set. When a new backup is created the oldest or first backup (GEN3) is deleted by HSM and the new backup then becomes the third backup , maintaining the number of backup generations at three.

SGHTSODA POOL is a SMS Managed Pool. Data set names that are specified in the SMS ACS Routines are directed to this pool when the allocated data set matches the SMS ACS data set. The (**UNIT=**) parameter is not required when SMS controls the placement of data sets.

Data set examples below:

- **HAP##.***
- $**HACTM0.***
- **#HACTM0.***
- **@HACTM0.***

No HSM Migration is done for this Pool.

HSM Backups are done for newly created (OPENED) or pre-existing (CHANGED) data sets from Monday through Saturday evenings starting at 19:00.
HSM maintains a maximum of three backups (GENS) of each individual data set, when a new backup is requested the oldest or third backup (GEN3) is deleted by HSM and the new backup then become the first backup (GEN0), maintaining the number of backups at three.

WORK POOL is a MVS Esoteric Pool. System defined temporary data sets and temporary ADHOC data sets are the only data sets utilizing this pool.

Data set examples below:

- '**SORTWK##**' DD statement Data set
- '**&&DSN**' Temporary Data set
- Temporary User Data sets
- '**SYS02***.T******.RA000 S**ystem Temporary Data set

Note: Data sets not deleted at End-of-Job will be deleted daily at 16:00.

HSM Backup/Migration is excluded in this pool.

SYSDA POOL is a MVS Esoteric Pool. Data sets used for Production, Testing and Development that will remain in this pool for more than one day. To allocate data sets in this pool you would use the (**UNIT=)** parameter specifying one of three esoteric pool names (**SYSDA ; PSYSDA ; TSYSDA**) in the JCL.

Data set examples below:

- Data sets with DSORG of (**DA, PO, PS, VSAM**)
- Permanent type data sets

HSM Migration of data sets starts after five (5) days of non-use (Unchanged) by migrating (MOVING) data sets from it's original volume to a HSM ML1 (DASD) volume, after 30 days of non-use on ML1 (Not Recalled) the data set would be migrated to a HSM ML2 (TAPE) volume. The migrated data set would remain on ML2 for a period of two years before being deleted by HSM.
HSM maintains one copy of a migrated data set since HSM physically moves a data set. When displaying a migrated data set it will show a volume of MIGRAT1 or MIGRAT2 depending on the migration level.
If a migrated data set cannot be recalled, you can delete the migrated copy and recover with a backup data set if appropriate.

HSM Backups are done for newly created (OPENED) or pre-existing (CHANGED) data sets from Monday through Saturday evenings starting at 19:00.
HSM maintains a maximum of three backup versions of each individual data set. When a new backup is created the oldest or first backup (GEN3) is deleted by HSM and the new backup then becomes the third backup , maintaining the number of backup generations at three.

SGHSYSDA POOL is a SMS Managed Pool. Data set names specified in the SMS ACS Routines are directed to this pool when the allocated data set name matches the SMS data set name. The (**UNIT=**) parameter is not required with SMS controlling the placement of data sets.

Data set examples below:

- **@, #, $HAO.***
- **@, #, $HAP.***
- **@, #, $HAS.***
- **@, #, $HAU.***
- **@, #, $HAV.***

HSM Migration of data sets starts after five (5) days of non-use (Unchanged) by migrating (MOVING) data sets from it's original volume to a HSM ML1 (DASD) volume, after 30 days of non-use on ML1 (Not Recalled) the data set would be migrated to a HSM ML2 (TAPE) volume. The migrated data set would remain on ML2 for a period of two years before being deleted by HSM.
HSM maintains one copy of a migrated data set since HSM physically moves a data set. When displaying a migrated data set it will show a volume of MIGRAT1 or MIGRAT2 depending on the migration level.
If a migrated data set cannot be recalled, you can delete the migrated copy and recover with a backup data set if appropriate.

HSM Backups are done for newly created (OPENED) or pre-existing (CHANGED) data sets from Monday through Saturday evenings starting at 19:00.
HSM maintains a maximum of three backup versions of each individual data set. When a new backup is created the oldest or first backup (GEN3) is deleted by HSM and the new backup then becomes the third backup , maintaining the number of backup generations at three.

DB3390 POOL is a MVS Esoteric Pool. All AHCCCS Datacom Database files are to be placed in this pool by specifying (**UNIT=DB3390**).

Data set example below:

- **$ACD.***
- **#ACD.***
- **@ACD.***

HSM Backup/Migration is excluded from this pool:

DC3390 POOL is a MVS Esoteric Pool. All DRM Datacom Database files should be placed in the pool by specifying (**UNIT=DC3390**).

Data set example below:

- **$DRD.***

HSM Backup/Migration is excluded from this pool:

SGHA3390 POOL is a SMS Managed Pool. Data set names specified in the SMS ACS Routines are directed to this pool when the allocated data set name matches the SMS data set name. The (**UNIT=**) parameter is not required with SMS controlling the placement of data sets.

Data set example below:

- **$HAD.***

HSM Backup/Migration is excluded from this pool:

SGAFS POOL is a SMS Managed Pool. The Account Number specified in the SMS ACS Routines allows any data set to be directed to this pool when the Job Account Number matches the SMS Account number. The (**UNIT=**) parameter is not required with SMS controlling the placement of data sets.

HSM Backup/Migration is excluded from this pool:

SGTECH POOL is a SMS Managed Pool. Data set names specified in the SMS ACS Routines are directed to this pool when the allocated data set name matches the SMS data set name. The (**UNIT=**) parameter is not required with SMS controlling the placement of data sets.

Data set example below:

- **TEK*.***
- **TEK.***

HSM Migration is excluded in this Pool.

HSM Backups are done for newly created (OPENED) or pre-existing (CHANGED) data sets from Monday through Saturday evenings starting at 19:00.

HSM maintains a maximum of three backup versions of each individual data set. When a new backup is created the oldest or first backup (GEN3) is deleted by HSM and the new backup then becomes the third backup, maintaining the number of backup generations at three.

SGTEK POOL – is a SMS Managed Pool. Data set names specified in the SMS ACS Routines are directed to this pool when the allocated data set name matches the SMS data set name. The (**UNIT=**) parameter is not required with SMS controlling the placement of data sets.

Data set examples below:

- **CICSTS13.***
- **CICSS.***
- **CICS.***
- **CA.MUF*.***
- **CAI.***
- **SEA.PDSFAST.***
- **LANDMARK.***
- **#TED.***

HSM Migration is excluded in this Pool.

HSM Backups are done for newly created (OPENED) or pre-existing (CHANGED) data sets from Monday through Saturday evenings starting at 19:00.
HSM maintains a maximum of three backup versions of each individual data set. When a new backup is created, the oldest or first backup (GEN3) is deleted by HSM and the new backup then becomes the third backup, maintaining the number of backup generations at three.

1230.4 UNSUPPORTED DATASET TYPES

The Information Processing Center employs a product known as DFHSM (Data Hierarchical Storage Manager) to perform space and availability management on the majority of the DASD connected to the host. This product allows us to automatically manage our DASD and provides for the cleanup of obsolete data sets, movement of inactive data to cheaper storage medium and the backup and recovery of data sets through DFHSM BATCH processing and ISMF (Interactive Storage Management Facility).

In order for data to be eligible for management by DFHSM it must meet certain criteria. Because the use of DFHSM for management of data provides us with many benefits, we have set a policy that it will be used to manage our DASD pools. This means that we cannot allow unsupported data sets that do not have a (DSORG) or data sets that were created as (MULTI-VOLUME), on any of the volumes associated with these pools will not be backed up or migrated by DFHSM.

The Storage Administrator will monitor the DASD pools daily for the presence of these unsupported data sets, and will manage the data sets to make them manageable to DFHSM.

1230.5 REQUEST FOR ADDITIONAL SPACE

When large amount of DASD space is required by the customer for expanding their Database or implementing new Applications, Subsystems and additional large data sets. The Storage Administrator must to be contacted in advance in order to assist the customer in acquiring additional DASD space, and if required, ordering additional DASD to support the customer needs. It is imperative that the customer be aware that they are responsible for inquiring in advance for additional space requirements.
If additional DASD is required a SSR must be used to communicate these needs to the Storage Administrator.

1230.6 DASD BACKUP AND RECOVERY

The Information Processing Center currently employs a product called DFHSM (Data Facility Hierarchical - Storage Manager) that backs up data sets that reside on specific DFHSM managed volumes.

The schedule for all Backups are illustrated below by HSM and SMS pools:

XLO1 / XLO2	SMS	HSM	|------ DFDSS FULL VOLUME BACKUPS ------|				
Pool Name	By Pools	By Pools	Cycle	Offsite	Weekly	Monthly	Yearly
SGAFS	Yes	No	N/A	N/A	N/A	N/A	N/A
SGDOAV	Yes	No	Sun	Yes	Yes	Yes	Yes
SGTECH	Yes	Yes	Sun	Yes	Yes	Yes	Yes
SGTEK	Yes	No	Sun	Yes	Yes	Yes	Yes
DB3390	No	No	Sat	Yes	Yes	Yes	Yes
DC3390	No	No	Sat	Yes	Yes	Yes	Yes
TSODA	No	Yes	Sun	Yes	Yes	Yes	Yes
SYSDA	No	Yes	Sun	Yes	Yes	Yes	Yes
TSYSDA	No	Yes	Sun	Yes	Yes	Yes	Yes
PSYSDA	No	Yes	Sun	Yes	Yes	Yes	Yes
WORK	No	No	N/A	N/A	N/A	N/A	N/A
SYSTEM	No	Yes	Daily	Yes	Yes	Yes	Yes

XLO3	SMS	HSM	|------ DFDSS FULL VOLUME BACKUPS ------|				
Pool Name	By Pools	By Pools	Cycle	Offsite	Weekly	Monthly	Yearly
SGAFS	Yes	No	N/A	N/A	N/A	N/A	N/A
SGDOAV	Yes	No	Sun	Yes	Yes	Yes	Yes
SGTECH	Yes	Yes	Sun	Yes	Yes	Yes	Yes
SGTEK	Yes	No	Sun	Yes	Yes	Yes	Yes
SGHA3390	Yes	Yes	Sat	Yes	Yes	Yes	Yes
SGHTSODA	Yes	No	Sun	Yes	Yes	Yes	Yes
SGHSYSDA	Yes	Yes	Sun	Yes	Yes	Yes	Yes
WORK	No	No	N/A	N/A	N/A	N/A	N/A
SYSTEM	No	Yes	Daily	Yes	Yes	Yes	Yes

Outlined below is the retention schedule for each type of backup, created at the Information Processing Center;

Incremental Backups - Only changed, new data sets are selected for backup during the Incremental Backup process. Once backed up the 'changed' indicator associated with the data set is reset and backup will not occur again until the data set is modified. During Incremental Backup, DFHSM will enqueue data sets and will not allow data sets to be modified, if a data set is in use DFHSM will bypass the data set, and will attempt to back up the data set at a later time. The Information Processing Center will maintain three 'changed' versions of an incrementally backed up data set. The incremental copies of data sets managed in this manner are in a DFHSM format on tape and recovery must be accomplished via DFHSM command or through ISMF (Interactive Storage Management Facility).

Note: It will be the customers responsibility for backing up those online data sets that reside on DFHSM volumes that may be open and active during the nightly Incremental Backup window.

Daily Incremental Backups - Three versions of each individual data set are backed up and kept by **HSM** for six months. A data set will be backed up as many times as a data set is modified.

Daily Full Volume Backups - Monday through Thursday, a selected set of volume backups are created using **FDR**. The three oldest backups are maintained onsite, with the seven most current sets of volumes maintained offsite.

Weekly Full Volume Backups - Every Saturday and Sunday except when the Monthly and Yearly backups are done, a set of volume backups are created using **DFDSS**. The three oldest sets of weekly backups are maintained onsite, with the three most current sets of volumes maintained offsite.

Monthly Full Volume Backups - Second Saturday and Sunday of the month, a set of volume backups are created using **DFDSS**. The ten oldest sets of backups are maintained onsite, with the three most current sets of volumes maintained offsite.

Yearly Full Volume Backups - Last month of year, on the second Saturday and Sunday of the month, a set of volume backups are created using **DFDSS**. The four oldest sets of backups are maintained onsite, with the three most current sets of volumes maintained offsite.

Based on the above cycles the farthest back the Information Processing Center can go for a data set on a full volume backup is **seven years**. If you want to recover a data set that is on one of the unsupported data set pools, then you must use a DFDSS restore. Again, if you have questions regarding recovery using this method contact the Storage Administrator. When contacting the Storage Administrator on a recovery question, please have the following information available:

A) What is the data sets name?

B) What volume did the data set last reside on?

C) What approximate date (Before or After) do you need the data set recovered from?

1230.7 MISC DASD TOPICS

DFHSM backup data sets that have expired and are no longer cataloged, or they are over six months old and will be processed on a weekly schedule by DFHSM and will be removed from DFHSM catalog.